(12) UK Patent Application (19) GB (11) 2 237 185 (13) A

(43) Date of A publication 01.05.1991

(21) Application No 8923391.0

(22) Date of filing 17.10.1989

(71) Applicant
Electrolux Limited

(incorporated in the United Kingdom)

Oakley Road, Luton, LU4 9QQ, United Kingdom

(72) Inventor
Geoffrey Martin Brewin

(74) Agent and/or Address for Service
Withers & Rogers
4 Dyer's Buildings, Holborn, London, EC1N 2JT, United Kingdom

(51) INT CL[6]
A47L 9/28

(52) UK CL (Edition K)
A4F FD12 FFB101 FFB203 FGA FG19 FHC13
H2J JSSS
U1S S1220 S1233

(56) Documents cited
EP 0299322 A2

(58) Field of search
UK CL (Edition J) A4F FGA FGB
INT CL[4] A47L

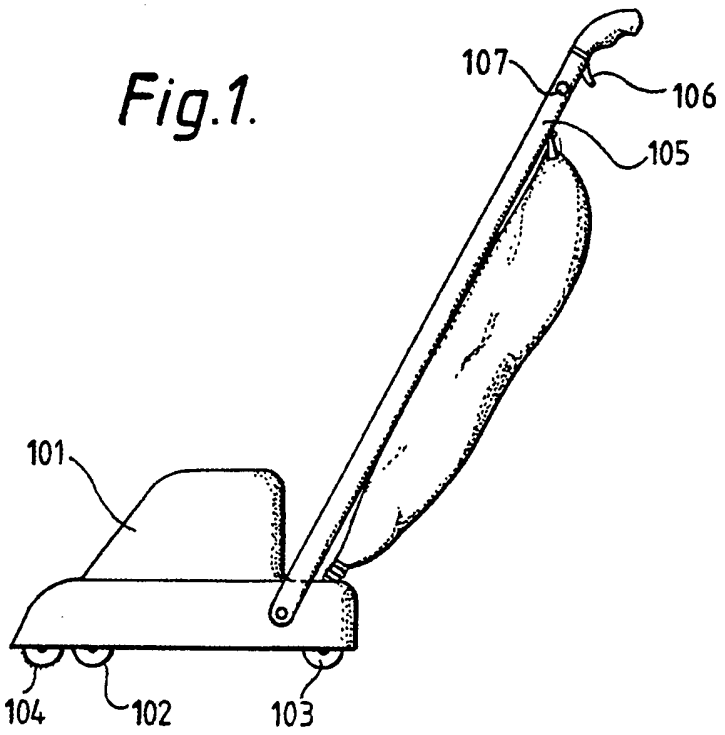
(54) Vacuum cleaner

(57) A vacuum cleaner of the upright type is provided with an electronic control circuit for the motor by means of which the motor may be run at either its normal power level or at an increased power level for a limited period. For an immediately following period the motor is prevented from operating at the increased power level so as to avoid sustained overload or damage to the surface being cleaned.

GB 2 237 185 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

Fig.1.


107
106
105
101
104
102
103

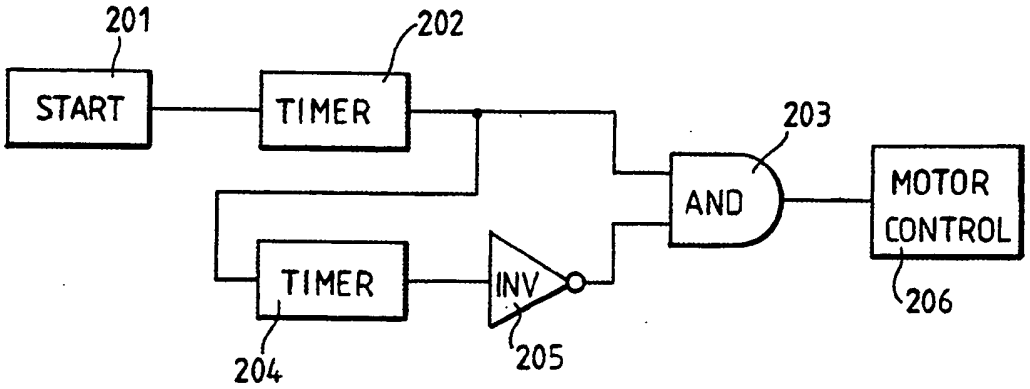

201
202
START
TIMER
203
AND
MOTOR
CONTROL
TIMER
INV
204
205
206

Fig.2.

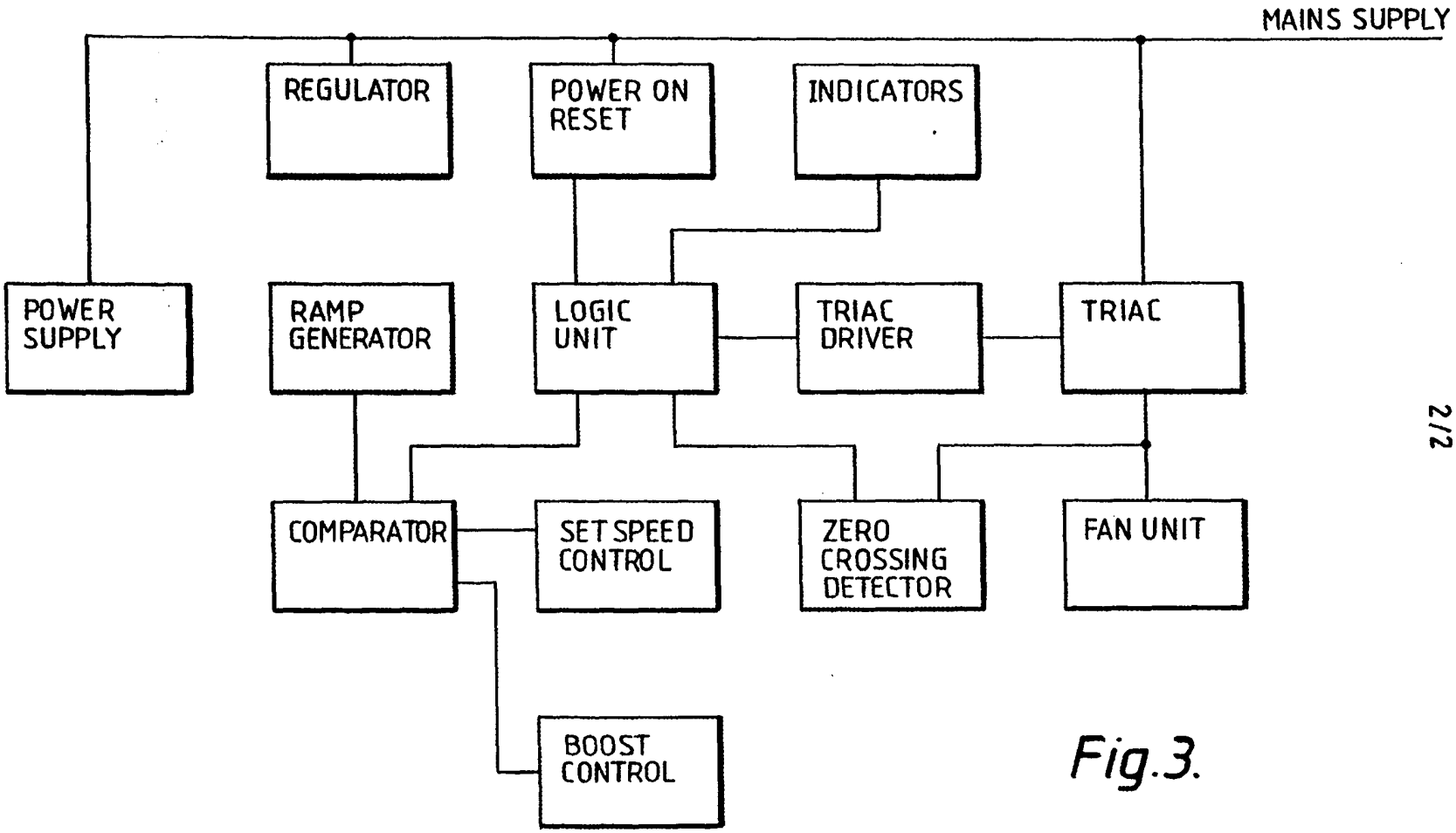


Fig.3.

UPRIGHT VACUUM CLEANER-BOOST CONTROL

UPRIGHT VACUUM CLEANER-BOOST CONTROL

1

2237185

The present invention relates to vacuum cleaners of the upright type. Such a vacuum cleaner comprises a cleaner body housing provided with a long handle so that it can be operated from a standing position. The housing includes a vacuum-generating impeller, a roller carrying brushes and/or beaters and a drive motor for the impeller and brush roller. Usually the impeller is mounted directly on the motor armature shaft and the brush roller is coupled to the motor by a belt drive.

The faster the impeller rotates the better the vacuum generated. On the other hand, at high speeds the brush roller causes excessive wear on the carpet being brushed, and considerable noise and vibration are generated. The power of the motor is chosen to give an optimum compromise between these factors, and it is usually difficult to make effective use of a motor with a power consumption of more than 600 watts.

An object of the present invention is to provide a vacuum cleaner of the upright type which is of simple construction and gives improved cleaning performance without excessive wear.

The invention, which is defined in the appended claims, makes use of an electronic control circuit by means of which for a brief predetermined period the cleaner motor can be run at a power level higher than its normal level, and then for a further period is prevented from running at the higher power level. By this means, increased cleaning power can be achieved when required, without risk of the motor overheating, and without excessive wear to a carpet being cleaned, or prolonged overloading or vibration which might cause mechanical damage.

The invention will be further described with reference to the accompanying drawings, in which

Figure 1 an overall view of a vacuum cleaner of the upright type, and

Figure 2 is a functional block diagram of the electronic control circuit for the vacuum cleaner of Figure 1.

Referring first to Figure 1, the vacuum cleaner is of generally conventional type apart from the control circuit of the motor. It comprises a body 101 supported on a pair of front wheels 102 and a pair of rear wheels 103, and containing a motor driving a vacuum impeller (not visible in the Figure) and a brush roller 104. The body is provided with a long handle 105 so that it can be operated from a standing position. The brush roller is mounted in an open mouth at the front of the body through which air is sucked by the vacuum impeller, so that dust dislodged by the brush roller is drawn into the machine. A dust-collecting bag is suspended from the handle to receive the collected dust.

A switch 106 fitted in the handle enables the motor to be switched on and off, and further switch means, which may consist of a push-button 107, is provided to initiate operation of the electronic circuit, which will be described below. Alternatively, the switch 106 may be a three-position switch, movement from the first to the second position switching the motor on, and further movement to the third position against a spring load initiating the electronic circuit operation.

In operation the vacuum cleaner is switched on, whereupon it runs at its normal power level. When an area is encountered which is particularly heavily soiled, or which because of its nature requires more vigorous cleaning than usual, operation of the electronic circuit is initiated by pressing and releasing the push-button 107 or by transient movement of the switch 106 to its third position, as the case may be. This causes the power level

to be substantially increased for a limited period, permitting more thorough cleaning. After the period of increased power has elapsed the electronic circuit ensures that the power level cannot again be increased for a further period, so ensuring that prolonged overload of the motor or excessive wear of the surface being cleaned does not occur.

The electronic circuit will now be described with reference to Figure 2, which is a functional block diagram explaining its mode of operation.

The period of increased motor power is started by the closing and re-opening of a pair of switch contacts, represented by the box 201, which sends a voltage pulse to a first timer 202. Operation of this timer is initiated by the trailing edge of this pulse, whereupon the timer generates a signal defining a first pre-set period, and this signal is applied to one input of an AND gate 203. The signal from the first timer is also applied to a second timer, 204, which defines a second pre-set period, and is likewise initiated by the trailing edge of its input signal. The output from this timer is inverted by an inverter 205 and applied to the other input of the AND gate 203. The output from the AND gate 203 controls the motor of the cleaner through a motor control circuit 206.

During the first pre-set period the timer 202 produces a high output signal which is present at one input of the AND gate 203. The timer 204 has not yet been triggered, and so its output voltage is low. This low voltage signal is inverted by the inverter 205 to produce a high signal at the second input of the AND gate 203, causing the AND gate to provide a signal to the motor control circuit 206, which thereupon increases the motor power.

When the first timer 202 times out its output signal goes low, and the trailing edge starts the second timer 204. The high output from this timer is inverted by the inverter 205 to hold

the second input of the AND gate 203 low, so that no further signal can be passed by this gate until the second pre-set period has elapsed.

The first pre-set period may be in the range 5 to 15 seconds, a suitable period being about ten seconds. The second pre-set period should be greater than the first, preferably twice as long or more, so as to reduce the possibility of overloading or damage by repeated operation.

The motor may conveniently be of a standard type used in domestic vacuum cleaners and having a power output of nominally 600 watts, temporarily increasing to 900 to 1000 watts. Such an increased power level can be safely accommodated without overload with the times suggested above.

The motor control circuit may be of the triac type. Alternatively, a DC motor and rectifier may be used, the motor control circuit switching an additional resistor in series with the field winding

The block diagram showing a boost control for the vacuum cleaner as described above is shown by way of example in Figure 3.

CLAIMS

1. A vacuum cleaner of the upright type provided with an electronic control circuit for the motor, the circuit including a manual control, a power control circuit for the motor arranged to cause the motor to run selectively at either its normal power level or an increased power level, and timing means coupled to the manual control and the motor power control circuit whereby, on operation of the manual control, the motor is caused to operate at its increased power level for a first pre-set period, and for an immediately following second pre-set period the motor is prevented from operating at its increased power level.

2. A vacuum cleaner of the upright type according to claim 1 in which the second pre-set period is greater than the first pre-set period.

3. A vacuum cleaner of the upright type according to claim 2 in which the second pre-set period is twice the first pre-set period.

4. A vacuum cleaner of the upright type according to any preceding claim in which the first pre-set period is in the range 5 to 15 seconds.

5. A vacuum cleaner of the upright type according to any preceding claim in which the normal motor power level is substantially 600 watts.

6. A vacuum cleaner of the upright type according to claim 5 in which the increased power level lies in the range 900 to 1000 watts.

7. A vacuum cleaner of the upright type according to any

preceding claim in which the power control circuit includ s a triac.

8. A vacuum cleaner of the upright type according to any preceding claim in which the motor switch is a three-position switch such that movement of the switch from a first to a second position switches the motor on, and further movement of the switch to a third position against a spring load initiates operation of the electronic control circuit of the motor.

Published 1991 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.